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(54) Title: METHODS AND SYSTEMS FOR PURIFYING ELEMENTS

(57) Abstract: There are provided methods of purifying a material, comprising melting solid material to form liquefied material, directionally solidifying a portion of the liquefied material; and removing a liquid remainder from the purified solidified material. Preferably, the purified solidified material is melted to form re-liquefied purified material, and re-liquefied purified material is removed. Preferably, the material is positioned in a container as it is being purified. The method is particularly useful for purifying elemental material, e.g., semiconductor material such as silicon and/or germanium, such as recycle scrap silicon and/or metallurgical grade silicon. There are also provided systems for carrying out such methods.

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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/30659

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C01B 33/02  
US CL : 423/348,349,350

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
U.S. : 423/348,349,350

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
WEST

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6,632,413 B2 (CLARK et al.) 14 October 2003 (14.10.2003), entire document	1-31
A	US 6,368,403 B1 (SCHMID et al.) 09 April 2002 (09.04.2002), entire document.	1-31
A	US 6,090,361 (BABA et al.) 18 July 2000 (18.07.2000), entire document.	1-31
A	US 5,972,107 (SCHMID et al.) 26 October 1999 (26.10.1999), entire document.	1-31
A	US 5,961,944 (ARATANI et al.) 05 October 1999 (05.10.1999), entire document.	1-31
A	US 4,769,107 (HELMREICH et al.) 06 September 1988 (06.09.1988), entire document.	1-31

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☐ See patent family annex.

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